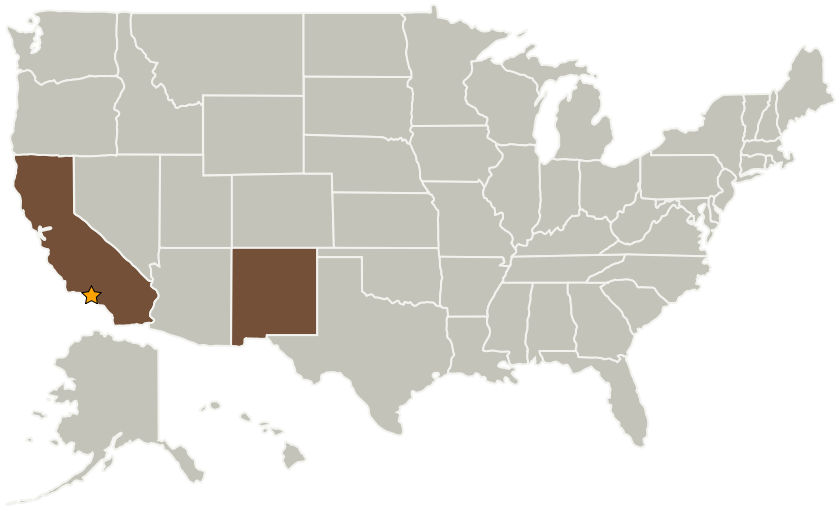
Optical Monitor for Major Air Constituents, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

The well-being of the crew on manned missions depends critical on the composition of the habitat air. Oxygen, carbon dioxide and water vapor are the most important air constituents that have to be monitored continuously. Optical monitoring with its features of high precision, strong species selectivity and fast response is the preferred method if lightweight, small and low power-draw instrumentation can be developed. Vertical cavity surface emitting lasers (VCSELs) are now available covering a broad wavelength range. These single frequency light sources are ideal candidates for high performance gas monitoring and especially suited for space applications due to their small size and extremely low power consumption. Vista Photonics proposes to develop technology based on these lasers that leads to small sensors that fulfill the strict requirements of spaceflight. The narrowband output of these lasers combined with wavelength modulation spectroscopy and a compact absorption cell will provide superior sensor performance. Inherent features like sensor health monitoring and recalibration without the use of expendable gases will be incorporated. The developed sensor will be fully automated and no maintenance will be required.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Vista Photonics, Inc.	Supporting Organization	Industry	Santa Fe, New Mexico

Primary U.S. Work Locations	
California	New Mexico

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.1 Sensors: Air, Water, Microbial, and Acoustic